Chapter 12

Thermographic Evaluation of Racehorse Performance

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ABSTRACT
Thermography has found a broad range of applications in equine sport and veterinary medicine. Thermographic diagnosis is useful in monitoring changes of horse surface temperature resulting from exercise allowing evaluation of the work of individual parts of the body in racing performance. Regular assessment of body surface temperature allows the detection of training overloads and identification of pathological conditions of the musculoskeletal system during the racing training cycle. The usefulness of thermography in veterinary medicine has been proved in detecting pathological conditions associated mainly with inflammation processes of the distal parts of the limbs and back. The main advantage of thermography is the detection of subclinical signs of inflammation before the onset of clinical signs of pathology, providing great value in veterinary medicine diagnosis. Thermography has also found application in detecting illegal performance procedures to improve horse performance and in assessing the saddle fit to the horse’s back.

INTRODUCTION
Thermography in equine veterinary medicine was introduced in 1965 and since that time has been considered for use in a wide range of applications (Delahanty & Georgi, 1965).
Thermography enables abnormal patterns in skin surface temperatures (and hence vascularity and metabolic activity within and below the skin surface) due to injury to be detected (Turner, 1991). One of the clinical signs of inflammation is heat, related to metabolic activity and an elevated local circulation, recognised thermographically as a ‘hotspot’ (Ring, 1990). Other pathological conditions reduce blood circulation due to either vascular shunts, thrombosis or autonomic nervous system abnormalities and are recognised as ‘coldspots’ (Turner, 1991; von Schweinitz, 1999).
Therefore thermography has been used increasingly in equine veterinary practice as an efficient tool for detection of injuries of the musculoskeletal system in sport horses (Turner et al., 2001). It has been
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employed especially in the racing industry, where the physical demands put on racing horses are extreme (Figure 1). Constant overload of the musculoskeletal system due to regular training and racing can cause abnormalities associated with painful conditions or diseases, leading to loss of performance (Jeffcott et al., 1982; Rossdale et al., 1985). Injuries are mainly associated with soft tissue or bone fractures of the distal parts of limbs (Jeffcott, 1999; Parkin et al., 2004; Head, 2009). They are often variably clinically manifested, ranging from overt lameness but also pain on palpation or gait alterations (Jeffcott, 1999; Denoix, 1999; Haussler et al., 1999).

Lameness is a significant disorder for racehorses, recognized as an abnormality associated with painful conditions or mechanical injuries, which affect the horse’s way of movement. Numerous reports describing lameness incidence in racehorses have been recorded in the United Kingdom. Investigations presented by Buchner et al. (1996), Ramdy (1997), Oliver et al. (1997), Jeffcott (1999), Kane et al. (2000), and Keegan et al. (2000) indicated that lameness is the main reason for training days being lost and wastage in the horse industry. In the study presented by Jeffcott et al. (1982), out of 163 Thoroughbred racehorses 53% suffered from lameness, which was the main cause of elimination of the horses from performance. A more recent study involving Thoroughbred racehorses recorded an 81% incidence of lameness (Williams et al., 2001).

One of the main problems with injuries is the long period of rehabilitation. Additionally, the reduced tissue functionality decreases the chance of the horse returning to its previous performance and soundness. It was reported that 70% of Thoroughbred horses failed to return to regular training after injury (Oikawa & Kasashima, 2002). Monitoring the impact of racehorse exercise programmes through the measurement of body surface temperature can help to detect potential injuries, maintain horse health and condition, and extend a horse’s career in sport.

Figure 1. Thermogram of a racehorse with the rider from the lateral aspect